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northern Maine, 2 from Utah and Nevada, and 1 from Mexico. In addition to the full descriptions and synonymy, the citations of stations and exsiccatae are very complete.

GRIFFITHS¹⁵ has described 9 new species of *Opuntia*, which have been growing under his observation for 5-8 years.

PITTIER¹⁶ has published a revision of *Inga*, a large American genus of leguminous trees, which has not been revised since 1875. He recognizes 212 species, 40 of which are new, representing 5 sections, which are further subdivided into series.

RENDLE¹⁷ has published *Maidenia* as a new genus of Hydrocharidaceae from West Australia. It is a delicate water plant 5-6 cm. high, covered with numerous threadlike leaves, and belongs to the Vallisneriaceae.

WERNHAM,¹⁸ in a seventh paper on the Rubiaceae of the American tropics, has published an analytical key to the genera. The extensive display of Rubiaceae in this region is indicated by the fact that 182 genera are recognized, distributed among 21 tribes.

WRIGHT¹⁹ has published a new genus (*Thuranthos*) of Liliaceae from South Africa, related to *Drimia* Jacq.—J. M. C.

Excretion of acids by roots.—HAAS²⁰ has taken up the much controverted question, do roots give off acids other than carbonic? He grew roots of early sweet corn in distilled water for 5 and for 19 days and tested the H+ concentration of the water against standard buffer solutions of phosphates with phenolphthalein as the indicator. He concludes that no acid other than carbonic is excreted by roots, but that decay of the roots does give a slight increase in the alkalinity of the water. The author says "The problem is important not only because acids dissolve plant food from the soil, but also because it involves the fundamental questions of the reaction of protoplasm and of the mechanism of excretion." This is true, but to answer the question in a way applicable to natural conditions one should not put them in the abnormal conditions offered by distilled water.²¹ One might also expect the

¹⁵ GRIFFITHS, DAVID, Additional species of *Opuntia*. Bull. Torr. Bot. Club 43: 523-531. pl. 30. 1916.

¹⁶ PITTIER, HENRY, Preliminary revision of the genus *Inga*. Contrib. U.S. Nat. Herb. 18:173-223. pls. 81-105. 1916.

¹⁷ RENDLE, A.B., A new genus of Hydrocharidaceae. Jour. Botany 54:313-316. pl. 545. 1916.

¹⁸ WERNHAM, H. F., Tropical American Rubiaceae. VII. Jour. Botany 54: 322-334. 1916.

¹⁹ WRIGHT, C. H., Diagnoses Africanæ. LXIX. Kew Bull. 1916:no. 9. p. 233.

²⁰ HAAS, A. R., The excretion of acids by roots. Proc. Nat. Acad. Sci. 2:561-566. 1916.

²¹ TRUE, R. H., The harmful action of distilled water. Amer. Jour. Bot. 1:255-273. fig. 1. 1914.

author to relate his work to the rather extensive work done on the differential absorption of ions by plant structures and the resulting changes in the reaction of the substratum.²² This promises explanation of the corrosive action of roots, their great power to absorb salts from soils, as well as their ability to redden neutral litmus. On account of this process some method other than that used by the author will probably need to be employed for investigating acid secretion in natural growth conditions, in the presence of nutrient solutions or soil. The value of this work as a basis for a general conclusion is doubtful, considering that only two experiments were performed on a single species, and these in an abnormal condition.—WM. CROCKER.

Subantarctic and New Zealand floras.—SKOTTSBERG²³ has continued the series of comparisons made between the floras of portions of the southern hemisphere characterizing the previous work of HOOKER, DIELS, SCHIMPER, WERTH, CHEESEMAN, and CHILTON, and revising the list of bicentric types by taking recent additions to the flora of Subantarctic America and New Zealand into consideration. The list includes 49 orders. These may be referred to groups comprising (1) an Australian and New Zealand element in America, (2) an Andine element in New Zealand and Australia, and (3) an old Antarctic element which is more strictly bicentric. Of the last group *Nothofagus* is a striking example, with 6 species in New Zealand, 1 in Tasmania, 1 in Tasmania and New South Wales, 1 in New South Wales, and 8 in Chili with 3 extending to Fuegia.

He includes some recent evidence from fossil plants found in Graham Land, and concludes that there existed an Antarctic Tertiary flora resembling the present floras of Subantarctic America, New Zealand, and Australia, and that the Antarctic continent may have been a center of evolution from which plants and animals wandered north. The present flora is due therefore to a combination of old wanderings, the extinction of certain species during the Ice Age, the survival of others, and finally transoceanic migrations, which, if they ever took place, are still going on.—GEO. D. FULLER.

Subalpine plants of the Rocky Mountains.—Adding to a series of phytogeographical papers upon the Rocky Mountain region already noted,²⁴ RYDBERG²⁵ has analyzed the subalpine flora of the region. It consists of about 800 species, of which only 10 per cent are entirely restricted to the subalpine zone. About 20 per cent of the whole number are transcontinental plants,

²² SKENE, M., The acidity of *Sphagnum* and its relation to chalk and mineral salts. Ann. Botany 29:65-87. 1915.

²³ SKOTTSBERG, CARL, Notes on the relations between the floras of Subantarctic America and New Zealand. Plant World 18:129-142. 1915.

²⁴ BOT. GAZ. 62:83-84. 1916.

²⁵ RYDBERG, P. A., Phytogeographical notes on the Rocky Mountain region. VI. Distribution of the subalpine plants. Bull. Torr. Bot. Club 43:343-364. 1916